

ROLE OF ICT SECTOR IN HIGHER EDUCATION AFTER ECONOMIC REFORM IN INDIA

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ABSTRACT

For India to emerge as a knowledge super power of the world in the shortest possible time it is imperative to convert our demographic advantage into knowledge powerhouse by nurturing and honing our working population into knowledge or knowledge enabled working population. Human Resource Development would certainly be the key for it to happen. ICT (information and communication technology) has become within a very short time, one of the basic building blocks of modern society. In developing countries where higher education is fraught with serious challenges at multiple levels, there is increasing pressure to ensure that technological possibilities are viewed in the context of educational needs. The use of ICT in education lends itself to more student-centered learning settings and often this creates some tensions for some teachers and students. But with the world moving rapidly into digital media and information, the role of ICT in education is becoming more and more important and this importance will continue to grow and develop in the 21st century. It is obvious that emphasis on ICT is a crying need as it acts as a multiplier for capacity building efforts of educational institutions without compromising the quality and is also necessary to sustain a high growth rate of our economy through the capacity building and knowledge empowerment of the people and for promoting new upcoming multidisciplinary fields of knowledge.

Keywords : ICT, Education, Evolution of ICT in Indian education sector, role of ICT in higher education, qualitative data analysis, information and communication technology, interpretive tasks, mechanistic tasks.

INTRODUCTION: ECONOMIC REFORM

In 1991 India embarked on major reforms to liberalize its economy after three decades of socialism and a fourth of creeping liberalization. Twenty five years later, the outcome has been an outstanding economic success. India has gone from being a poor, slow growing country to the fastest growing major economy in the world in 2016. The *World Economic Outlook* for 2016 says that the United States and India are the two pillars of strength today that are helping hold up a sagging world economy. The past 25 years of liberalization are largely a story of private sector success and government failure and of successful economic reform tarnished by institutional erosion. Even as old controls have been abolished, new ones have been created, so what left is the critics call an era of neo liberalism could more accurately be called neo-liberalism. In June 1991 a new government was installed in the country after a period of economic precariousness combined with political instability. For the next five years the political process and the economy were managed by the unlikely duo of P.V. Narasimha Rao and Manmohan Singh, respectively. The policy changes that had been initiated then have come to be known as "the

economic reforms". But even decade's later finance ministers of both the UPA and NDA speak of the need for "more reforms". This must confuse the layperson for it suggests a process that is never completed. It is of course true that as our understanding of the working of the economy evolves, fresh avenues for reform of policy open up. However, the reforms of 1991 were based on a certain idea of what was needed and a substantial part of the agenda announced then has been implemented. So as the 25th anniversary of the reforms approaches, it would be legitimate to take stock of what has been achieved, especially the extent to which they have succeeded in terms of the expectation.

INTRODUCTION OF ICT SECTOR

ICT in education in India include Indira Gandhi National Open University (IGNOU) uses radio, television, and internet technologies. National Program on Technology Enhanced Learning is a concept similar to the open courseware initiative of MIT. It uses Internet and television technologies. An Eklavya initiative uses Internet and television to promote distance learning. IIT-Kanpur has developed „Brihaspati“, an open source e-learning platform (Virtual Class Room). And Premier institutions like IIM Calcutta have entered into a strategic alliance with NIIT for providing programmes through virtual classrooms. Jadavpur University is using a mobile-learning centre. IIT-Bombay has started the program of CDEEP (Centre for Distance Engineering Education Program) as emulated classroom interaction through the use of real time interactive satellite technology. ERNET & EDUSAT (GSAT-3) systems provide support to Tele-education system of Distance learning to reach the un-reached people of India in every nook and corner. INFONET and CEC (Consortium for Educational Communication) services of University Grants Commission supporting E-content, E-learning and E-course systems. Information and Library Network (INFLIBNET) Centre is an Autonomous Inter-University Centre (IUC) of University Grants Commission (UGC) involved in creating infrastructure for sharing of library and information resources and services among Academic and Research Institutions. (Neeru snehi 2009) Information and Communication Technologies (ICTs) are referred to as the varied collection of technological gear and resources which are made use of to communicate. They are also made use of to generate, distribute, collect and administer information. Information and Communication Technologies are defined as all devices, tools, content, resources, forums, and services, digital and those that can be converted into or delivered through digital forms, which can be deployed for realising the goals of teaching learning, enhancing access to and reach of resources, building of capacities, as well as management of the educational system. These will not only include hardware devices connected to computers, and software applications, but also interactive digital content, internet and other satellite communication devices, radio and television services, web based content repositories, interactive forums, learning management systems, and management information systems. These will also include processes for digitisation, deployment and management of content, development and deployment of platforms and processes for capacity development, and creation of forums for interaction and exchange.

Introducing ICT as a tool to support the education sector has initiated substantial discussions since the late 1990s. A decade ago the emphasis was on Technical and Vocational Education and Training and training teachers. During the last few years an increasing number of international development agencies have embraced the potential of ICT to support the education sector. UNESCO has played a major role in spearheading the Education for All initiative to harness the potential of ICT. ICT has become a buzzword while talking about technology and its applications.

OBJECTIVES OF ICT IN HIGHER EDUCATION

1. To determine the evolution of ICT in Indian Education Sector.
2. To determine the role of ICT in higher Education and Research.
3. To explore how ICT as a change agent in Higher education and research.

ROLE OF ICT SECTOR IN HIGHER EDUCATION

ICT role in higher education is solicited for improving quality, widening access and enhancing operational efficiency across all functions in higher education sector and to create new dynamics in higher education both at micro and macro levels (J.Meenakumari, krishnaveni). Introduction of ICTs in the higher education has profound implications for the whole education process ranging from investment to use of technologies in dealing with key issues of access, equity, management, efficiency, pedagogy, quality, research and innovation. India's higher education system stands third in size in the world after the US and China with nearly 26 million students in over 35,000 institutions in the country. In the last decade the country has witnessed a particularly high growth rate in student enrolment at a CAGR (Compound annual growth rate) of 10.8% and institutions at 9%. The University Grants Commission (UGC) which enforces its standards is the main governing body at the tertiary level and advises the government, coordinating between the centre and the state. Accreditation for higher learning is monitored by twelve autonomous bodies established by the UGC.

Table -1

No. of Institutions/ Enrolment	2010-11	2011-12
Universities	621	642 (upto December,2013)
Colleges	32974	34908
Enrolment(figure in lakh)	275.00	285.63
Enrolment in Distance mode(Figure in lakh)	33.14	35.60 lakh

Source: All India Survey on Higher Education (2010-2011) and 2011-12 (provisional)

The above statistics shows that there is good growth in universities/ colleges and enrolment between 2010-11 and 2011-12 which indicates that higher education system is on right track. There is phenomenal growth of 1937 colleges during that period. At the same time enrolment figure also shows positive picture of higher education and also indicates the success of distance mode in higher education.

The University Grants Commission(UGC), is a statutory organisation established by an Act of Parliament in 1956 for the promotion and coordination of University Education and for the determination of teaching, examination, research and extension in Universities and maintenance of standards. Apart from providing grants to universities and colleges, the Commission also advises the Central and State Governments on the measures necessary for development of higher education. It functions from New Delhi as well as through its six Regional Offices located in Hyderabad, Bangalore, Guwahati, Kolkata, Bhopal and Pune. UGC's Plan Budget Estimate for the year 2013-2014 is distributed under the following eight sectors:-

Table -2

(Rs. in crores)

S.No.	Sectors*	Total
1.	Enhance aggregate access	4410.00
2.	Equity	175.20
3.	Quality and Excellence	388.20
4.	Research Projects	441.20
5.	Relevance and value based education	128.00
6.	ICT Integration	3.00
7.	Governance and Efficiency improvement	6.20
8.	Others(New schemes and committed liability of XI plan)	165.20
	Total	5717.00

Brief details of Sector-wise schemes/programmes of UGC are at **Appendix-1**.

The above table shows details of sector wise schemes and programmes of UGC are given. Total 5717.00 Crore Rs. spent on various sectors such as Quality and excellence , research projects, ICT integration etc. by (UGC) University Grants Commission

ICT AND HIGHER EDUCATION

India, like any other knowledge economy, depends on the development of its educational sector. Higher education drives the competitiveness and employment generation in India. The major teaching and learning challenges facing higher education revolve around student diversity, which includes, amongst others, diversity in students' academic preparedness, language and schooling background.

However, research findings have shown that the overall state of higher education is dismal in the country. There is a severe constraint on the availability of skilled labor (Agarwal, 2006). There exist socio-economic, cultural, time and geographical barriers for people who wish to pursue higher education (Bhattacharya and Sharma, 2007). Innovative use of Information and Communication Technology can potentially solve this problem.

Education is perhaps the most strategic area of intervention for the empowerment of girls and women in any society and the use of information and communication technologies (ICTs) as an educational tool in the promotion of women's advancement has immense potential. The application of ICTs as a tool for effective enhancement of learning, teaching and education management covers the entire spectrum of education from early childhood development, primary, secondary, tertiary, basic education and further education and training. Integrating ICT in teaching and learning is high on the educational reform agenda. Often ICT is seen as indispensable tool to fully participate in the knowledge society.

ICT also help teachers to work in teams and share ideas related to schools curriculum. There is also evidence that broadband and interactive whiteboards play a central role in fostering teachers' communication and increasing collaboration between educators. ICTs need to be seen as "an essential aspect of teaching's cultural toolkit in the twenty-first century, affording new and transformative models of development that extend the nature and reach of teacher learning wherever it takes place" (Leach, 2005). For developing countries like Vietnam, ICT can moreover be seen as a way to merge into a globalizing world. It is assumed that ICT brings revolutionary change in teaching methodologies. Many pupils consider ICT tools very helpful in that it helps them to do assignments teachers see that ICT enables students with special needs or difficulties. It also helps to reduce the social disparities between pupils, since they work in teams in order to achieve a given task. Students also assume responsibilities when they use ICT to organize their work through digital portfolios or projects. The Information and Communication Technology (ICT) curriculum provides a broad perspective on the nature of technology, how to use and apply a variety of technologies, and the impact of ICT on self and society. Technology is about the ways things are done; the processes, tools and techniques that alter human activity. ICT is about the new ways in which people can communicate, inquire, make decisions and solve problems. It is the processes, tools and techniques for:

1. Gathering and identifying information
2. Classifying and organizing
3. Summarizing and synthesizing
4. Analyzing and evaluating
5. Speculating and predicting

Enhancing and upgrading the quality of education and instruction is a vital concern, predominantly at the time of the spreading out and development of education. ICTs can improve the quality of education in a number of ways: By augmenting student enthusiasm and commitment, by making possible the acquirement of fundamental skills and by improving teacher training. ICTs are also

tools which enable and bring about transformation which, when used properly, can encourage the shift an environment which is learner-centered. ICTs which can be in the form of videos, television and also computer multi media software, that merges sound, transcripts and multicolored moving imagery, can be made use of so as to make available stimulating, thought provoking and reliable content that will keep the student interested in the learning process. The radio on the other hand through its interactive programs utilizes songs, sound effects, adaptations, satirical comedies and supplementary collections of performances so as to induce the students to listen and get drawn in to the training that is being provided. The use of online pedagogy within universities and management institutes is increasing. The introduction of the Wi-Fi system too has led to the growth of hi-tech education system, where 34 accessibility and accountability of subject matter is made readily available to the students. The students can now study and comprehend the related information at their own convenient time.

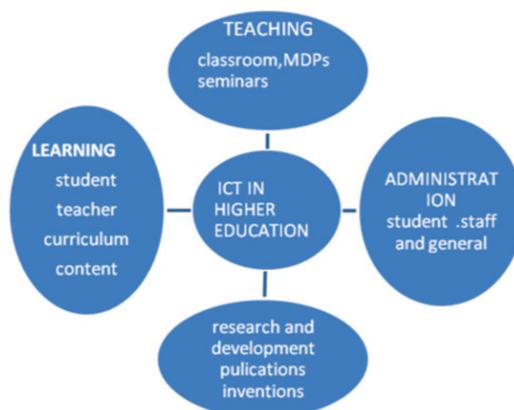


Fig 1: Integration of ICT in higher education

ICT IN RESEARCH

Integration of ICT in higher education promotes research to move forward, as known to all that Indian research work is lagging behind and very less percentage of initiatives in research field due to lack of supporting systems and the quality of the research also not on par with other nations. With the integration of ICT in Indian higher education enhances the quality of research work and more number of individuals enrolled in the research work in various fields. It is accepted that the mechanistic tasks of qualitative data analysis, for example, organising, storing, reproducing and retrieving data, can be undertaken more efficiently and systematically using ICT than manually. Applications of ICTs are particularly powerful and uncontroversial in higher education's research function. Four areas are particularly important: The steady increases in bandwidth and computing power available have made it possible to conduct complex calculations on large data sets. Communication links make it possible for research teams to be spread across the world instead of concentrated in a single institution. The combination of communications and digital libraries is equalizing access to academic resources, greatly enriching research possibilities for smaller institutions and those outside the big cities. It is the creative and interpretive stages of qualitative data analysis, requiring human reflection and understanding, which are most difficult to reconcile with the application of ICT. Taking full advantage of these trends to create new dynamics in research requires national policies for ICTs in higher education and the establishment of joint information systems linking all higher education institutions. The application of ICTs in academic research has grown steadily in the past 10 to 15 years in both developing and developed countries, although there are wide variations in usage both within and between countries and regions. The most straightforward use of ICTs in research is in data processing. The unprecedented growth in

bandwidth and computing power provide opportunities for analyzing/processing huge amounts of data and performing complex computations on them in a manner that is extremely fast, accurate and reliable. Computer data processing not only frees researchers from the cumbersome task of manually analyzing data but more importantly facilitates quick and accurate analysis of huge amounts of data from national samples or even multi-national samples covering tens of thousands of respondents. Software packages are now available to assist with the analysis of qualitative data which on the surface promise the same routinisation and speed benefits for the user as those available for quantitative analysis. Another important dimension of ICTs in research is the use of online full text databases and online research libraries/virtual libraries which are the direct outcome of the growth in telecommunications networks and technology. These databases and libraries provide researchers with online access to the contents of hundreds of thousands of books from major publishing houses, research reports, and peer-reviewed articles in electronic journals. ICT has also played a major role in university and industry partnership in Europe. The University of Minnesota's MBBNet (a web portal of the state's virtual biomedical and bioscience community) in collaboration with Zurich Med Net (a web based information source covering 400 universities, companies and institute) offers links to more than 1,300 organizations in the area of technology transfer.

BENEFITS AND PROSPECTS OF ICT IN HIGHER EDUCATION

Various benefits have been done through ICT in Higher education in India. In the field of Higher Education tools are now available on the Internet to assist both teachers and students to manage writing assignments to detect and avoid the pitfalls of plagiarism and copyright violations. One of the great benefits of ICTs in teaching is that they can improve the quality and the quantity of educational provision. Even though students can benefit immensely from well-produced learning resources, online teaching has its own unique challenges as not all faculties are ICT literate and can teach using ICT tools. Skills development is another important area in which ICT could be used effectively. Attempts are being made to strengthen the ICT framework for Technical and Vocational Education (TVET). Some more benefits are mentioned below:

1. Eliminating time barriers in education for learners as well as teachers (Sanyal, 2001; Mooij, 2007; Cross and Adam, 2007; UNESCO, 2002; Bhattacharya and Sharma, 2007)
2. The increasing use of information and communication technologies (ICTs) has brought changes to teaching and learning at all levels of higher education systems (HES) leading to quality enhancements.
3. Eliminating geographical barriers as learners can log on from any place (Sanyal, 2001; Mooij, 2007; Cross and Adam, 2007; UNESCO, 2002; Bhattacharya and Sharma, 2007)
4. During the last decade, higher education has gained importance in India's changing policy landscape as the government realizes that India's strength lies in education. The gap between demand and supply of higher education has necessitated the governments and institutions to formulate the policies for the better use of ICT. And, in order to bridge the gap, it is necessary to evolve the cooperation between the public and private sectors for the successful implementation of ICT in higher education (R.Nayak Indian Express, 2011)
5. Asynchronous interaction is made possible leading to thoughtful and creative interaction (Sanyal, 2001; UNESCO, 2002; Bhattacharya and Sharma, 2007);
6. The evolution of ICT into universities clearly changes the way education is conducted. Not only is it possible to work with distance learning and achieve a closer collaboration between different universities, but also paving the way for a new pedagogical approach where there is unparallel

ability to spread knowledge and disseminate information. The pace of change brought about by new technologies has had a significant effect on the way people live, work and play worldwide (Rev. Dr. Obiora Nwosu)

7. Enhanced group collaboration made possible via ICT (Plomp et al., 2007; Sanyal, 2001; Bhattacharya and Sharma, 2007);
8. It can also be used for non-formal education like health campaigns and literacy campaigns (UNESCO, 2002)

CONCLUDING OBSERVATIONS

As move into the 21st century, many factors are bringing strong forces to bear on the adoption of ICTs in education and contemporary trends suggest will soon see large scale changes in the way education is planned and delivered as a consequence of the opportunities and affordances of ICT. It is believed that the use of ICT in education can increase access to learning opportunities. The government and the private sector will continue to play a key role in improving the reach of good quality education to all the corners of the country. It can help to enhance the quality of education with advanced teaching methods, improve learning outcomes and enable reform or better management of education systems. Most of the under-represented communities today are able to access better education at elementary and higher levels. However the ancient system of social divide as a whole remains unshakably strong and continues to resist change howsoever economy or technology attempts to Extrapolating current activities and practices, the continued use and development of ICTs within education will have a strong impact on: What is learned, how it is learned, when and where learning takes place, & who is learning and who is teaching. The continued and increased use of ICTs in education in years to come, will serve to increase the temporal and geographical opportunities that are currently experienced. The integration of ICTs in higher education is inevitable. The very high demand for higher education has stimulated significant growth in both private and public provision. ICTs in the form of Management Information Systems are increasingly universal. The strength of computers in teaching is their power to manipulate words and symbols - which is at the heart of the academic endeavor. ICT has also led to the emergence of Open Educational Resources (OERs). The use of ICT creates an open environment which enables the storage and the reuse of information materials as also it enables the interface among the teachers as well as students. Still it is appreciable that several policy initiatives undertaken by the government are continuing to demonstrate better efficacy and gradual success. The turn of the twenty first century has brought about a revolution in technology and with it have tremendous changes been made across the education system of the country. Apart from having enabling telecommunications and ICT policies, governments and higher education institutions will need to develop strategies for effective ICT and media deployment and sustainability.

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